

Annotated list of seed plants of Singapore (IV)*

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II. Angiosperms-Dicotyledons (continued)

29. BIXACEAE

Key to the genera

A. Leaves entire; flowers pale pink

Bixa

A. Leaves 3-5-lobed; flowers yellow

Cochlospermum

Bixa orellana Linn.

Shrub or small spreading tree; leaves heart-shaped; flowers pale pink; fruit a purple capsule with soft hairs; seeds with a pulpy coat containing a orange-red juice — *Anatto* — which is used as a dye in cosmetics and in dairy products. Native of trop. America, planted as an ornamental. Vern. *Kesumba*, 紅木, 胭脂木。

Cochlospermum religiosum Alston

Small tree; leaves 3-5-lobed; flowers golden yellow; fruit pear-shaped, smooth; seeds coiled, covered with long hairs — *yellow cotton tree*. Native of India, planted as an ornamental.

30. VIOLACEAE

Key to the genera

A. Herbs; corolla irregular

Viola

A. Shrubs or trees; corolla regular

Rinorea

Rinorea anguifera (Lour.) O.K.

Shrub or small tree; leaves ovate, serrate; flowers small, white, in axillary cymes; capsule 3-5 cm across, covered with soft, long hairs; in dry woods, Bukit Timah, Chan Chu Kang, Chua Chu Kang (*Ridley s.n.* in 1894). Called *Alsodeia echinocarpa* Korth. in Ridley's Flora. Vern. *Sebilek*.

Rin. lanceolata (Wall.) O.K.

In forests, Ang Mo Kio, Changi (Ridley 1813). Called *Alsodeia grandiflora* Ridl. & *Al. floribunda* King in Ridley's Flora.

Viola odorata Linn.

Native to Europe, occasionally planted in pot. 香堇菜。

* Continued from *Gdns' Bull. Sing.* 27 : 266, 1974.

31. FLACOURTIACEAE

Key to the genera

- A. Flowers bisexual.
 - B. Leaves without 2 glands.
 - C. Ovary superior; berry entirely free; flowers in axillary clusters *Casearia*
 - C. Ovary half-inferior; capsule connate with the calyx in the lower half; flowers in racemes *Homolium*
 - B. Leaves with 2 distinct glands at the base of the blade; fruit a berry *Scolopia*
- A. Flowers unisexual
 - D. Flowers in axillary clusters; fruit baccate with a ring of 4-8 bifid styles *Flacourtia*
 - D. Flowers in spikes or panicles
 - E. Flowers in panicles; capsules 3-valved *Osmelia*
 - E. Flowers in racemose spikes; fruit baccate *Ryparosa*

Casearia capitellata Bl.

Shrub or small tree, pubescent; flowers green, few in axillary clusters; fruit orange, subglobose (1.2 x 0.8 cm); Gardens' jungle, Chua Chu Kang (*Ridley* s.n. in 1892). As *Cas. lobbiana* Turcz. in *Ridley's Flora*.

Cas. clarkei King

Tree; flowers small, in dense clusters; fruit ovoid, bright yellow (5-6 x 2.5-3 cm); Chan Chu Kang (*Ridley* 6334).

Cas. tuberculata Bl.

Small tree; flowers white, often galled; fruit oblong (4-5 x 1.6 cm), orange-red; once collected by Wallich (7197) in 1822. *C. coriacea* Vent in *Ridley's Flora*.

Flacourtia jangomas (Lour.) Raeusch.

Small tree, thorny below; fruit purple or red, edible, 1.5-2.5 cm across. Cultivated around villages, possibly native of India. Vern. *Rukam*.

Flac. rukam Z. & M.

Small tree, thorny below; flowers small, in axillary clusters; berry globose, pink to reddish, good for making jams; fruit from the cultivated form is also edible; in damp forest, Chua Chu Kang (*Ridley* s.n. in 1894).

Homalium grandiflorum Benth.

Buttressed tree; flowers in racemes or panicles; calyx teeth 7-9; capsules spindle-shaped; in lowland forests, rare, Gardens' jungle, Tanglin, Kranji.

Osmelia philippina Benth.

Tree; flowers in panicles, densely yellow tomentose, fruit a capsule, red, tomentose; in lowland forest, Chan Chu Kang (*Ridley* s.n. in 1894), Bukit Timah, Bukit Mandai.

Pangium edule Reinw.

Seeds of this species, known as *Buah Keluak*, imported from northern Malaya, used as culinary flavour.

Ryparosa hullettii King

Shrub or tree; male spikes 30–40 cm long; female spikes 4–8 cm long; berry fusiform, with leathery pericarp, 2–3 seeded; in dense forest, rare, Fern Valley of B.T.N.R. (*Ngadiman 35947*) and Chan Chu Kang.

Ryparosa wallichii Ridl.

Tree; flowers small, male spikes 5–8 cm long; once collected in Gardens' jungle. No specimen available.

Scolopia macrophylla (W. et A.) Clos.

Shrub or small tree, thorny; flowers greenish white, in racemes; connective of anthers producing into an appendage; berry orange to black; in mangroves, Changi (*Ridley 1818*), Serangoon.

32. TURNERACEAE*Turnera subulata* J.E. Smith

Different from the following species by its broader leaves and by the presence of a dark purple eye in the corolla; native of tropical America.

Turn. ulnifolia L.

Herb, erect or ascending; leaves ovate, serrate, with a pair of small glands at the base of blade; flowers bright yellow; cultivated, now escaped and naturalized in open sandy places. Native of the West Indies.

33. PASSIFLORACEAE

A. Flowers unisexual; fruit capsular

Adenia

A. Flowers bisexual; fruit baccate

Passiflora

Adenia microphylla Koord. var. *singaporeana* (Wall. ex D. Don) de Wilde

Slender woody climber; fruit spindle-shaped, 5 cm long; in margins of thickets, B.T.N.R. (*Ridley 5710*), Gardens' Jungle, Chan Chu Kang, Nee Soon. Called *Adenia singaporeana* Engl. in Ridley's Flora.

Passiflora foetida Linn.

Slender climber; leaves 3-lobed; flowers white; fruit orange, globose (1.5–2 cm across), enclosed in the green, fimbriate, sticky involucre of 3 bracts. A common weed, native of S. America, $\pm$ naturalized.

Pass. laurifolia Linn.

Climber; leaves oblong; flowers violet-banded with white; fruit as big as a hen's egg, yellow with 2 green bracts at the base. Native of S. America; cultivated and escaped. Vern. *Buah susu*.

Pass. quadrangularis Linn.

Large climber; stem 4-angled, soft; leaves ovate; flowers 10–12 cm across, purple-banded with white; fruit pale green, oblong, to 18 cm long. The Granadilla, a native of S. America, sometimes cultivated.

Pass. subrosa Linn.

Small climber; leaves 3-lobed; flowers greenish, without true corolla; fruit globose, 1.2 cm across, green to dark purple. Native to S. America, escaped as a weed. Several other species are planted.

34. CARICACEAE

Carica papaya Linn.

Small tree, soft-wooded, with milky sap, mostly unbranched; leaves large, palmately lobed; flowers mostly unisexual, greenish yellow; berry cylindric to ellipsoid. The Papaya, native of Trop. America is widely cultivated as a fruit tree. Vern. Betik, 木瓜, 蕃木瓜。

35. CUCURBITACEAE

Key to the genera

- | | |
|--|----------------------|
| A. Anther-locules straight; flowers very small, in panicles | <i>Gymnopetalum</i> |
| A. Anther-locules conduplicate, worm-shaped. | |
| B. Corolla divided about $\frac{1}{2}$ to the base or less; coarse vines with solitary, yellow flowers and very large fruits | <i>Cucurbita</i> |
| B. Corolla divided nearly to the base, or the petals nearly free. | |
| C. Corolla-lobes fimbriate; fruit many-seeded | <i>Trichosanthes</i> |
| C. Corolla-lobes entire or nearly so. | |
| D. Flowers white; calyx-tube of the male flowers elongated; anthers included | <i>Lagenaria</i> |
| D. Flowers mostly yellow; calyx-tube of the male flowers short; anthers usually exserted. | |
| E. Anthers not or scarcely cohering; stamens inserted near the mouth of the calyx-tube. | |
| F. Male flowers racemose; fruit cylindric, smooth or angled, opening at the end | <i>Luffa</i> |
| F. Male flowers solitary; fruit ellipsoid, indehiscent | <i>Benincasa</i> |
| E. Anthers more or less cohering; stamens inserted below the mouth of the calyx-tube. | |
| F. Male flowers clustered, short-pedicelled | <i>Cucumis</i> |
| F. Male flowers racemose, or solitary and long-pedicelled, usually bracteolate | <i>Momordica</i> |

Benincasa hispida (Thunb.) Cogn.

Wax gourd is an ancient cultigen of unknown origin; also called *B. cerifera* G. Savi.; two common varieties are used as vegetables: the one with large, round, or ovoid fruit covered with white wax-like substance, *Tung Kwa* 冬瓜, the other with smaller cylindric fruit covered with silky white hairs, *Mo Kwa* 毛瓜. Vern. *Kundor*.

Citrullus lanatus (Thunb.) Mansf.

Also called *C. vulgaris* Schrad.; the water melon is a native of S. Africa; fruits of several varieties are found in the market, mostly imported. Vern. *Mendikai*, 西瓜。

Cucumis sativus L.

The cucumber is prob. a native of N. India; annual herb, climbing by simple tendrils; growing locally for its edible fruit. Vern. *Timun china*, 黄瓜。

Cucurbita moschata Duch. ex Poir.

The winter squash and several closely related species (*C. maxima* Duch., *C. pepo* L.) are natives of Mexico and C. America, occasionally planted; fruits in the market are mostly imported. Vern. *Labu Merah*, *Labu Ayer*, 南瓜, 番瓜。

Gymnopetalum cochinchinensis Kurz

Slender creeping herb, leaves 3–5-lobed; flowers white; fruit orange coloured, oblong (2 x 5 cm), 10-ridged, beaked; occasionally found in open places. No specimens available. Vern. *Sipam*.

Lagenaria siceraria Standl.

The bottle gourd is prob. a native of Africa; two common varieties in cultivation are: the one with the fruit slightly curved, large, pear-shaped, whitish green and hairy when young, used as cooked vegetable; the other has the fruit constricted in the middle, when ripe treated and used as a flask. Vern. *Labu ayer puteh*, 壺瓜, 葫蘆。

Luffa acutangula Roxb.

The angled Loofah is probably a native of trop. Asia; young fruit cooked and served as vegetables. Vern. *Ketola sanding*, 角瓜。

Luffa aegyptiaca Mill.

The smooth Loofah is probably a native of trop. Asia; young fruit edible, less common than angled Loofah; the network of strong fibre of the ripe fruit is used as a sponge; also called *L. cylindrica* Roem. Vern. *Ketola manis*, 絲瓜。

Momordica charantia L.

The bitter gourd is probably a native of trop. Asia; fruit pale orange, with smooth tubercled ridges; seeds white or brown, with scarlet arils; the unripe fruit used as vegetable. Vern. *Peria laut*, 苦瓜。

Trichosanthes arguina Linn.

The long and twisted, snake-like fruit with dark green and lighter patches; — *serpent gourd* — a less common vegetable, probably native of India. Vern. *Ketola ular*, 蛇瓜。

Trich. celebica Cogn.

Slender climber; leaves 3-foliolate; flowers, white, night-blooming; the corolla tubular, fimbriate; fruit yellow to red, ovoid (8 x 12 cm); seeds flat, embedded in slimy dark green pulp. Tanglin, Chan Chu Kang (*Ridley* 6783).

Trich. wallichiana Wight.

Fruit red, ellipsoid, obtuse, 5–10 cm long; at one time very common in woods and hedges in Singapore (Pulau Ubin, *Ridley* 446). Vern. *Akar Timun Gagak*, or *Crow's Pumpkin*.

Trich. wawraei Cogn.

Fruit, oblong, red. Mandai (Sinclair 40269).

36. **BEGONIACEAE****Begonia coccinea** Hook. f.

Erect, branched, glabrous; leaves obliquely oblong, not white-spotted, often red-margined; flowers red; pot plant, from Brazil.

Beg. heracleifolia Cham. & Schl.

Leaves rounded, shallowly 5-9-lobed, hairy on both surfaces, dark green above, brown-spotted; flowers white or pink, from Mexico.

Beg. masoniana Hort.

Leaves brightly green, with a purplish-black cross-shaped spot on the upper surface; the *Iron Cross Begonia* is a variety which originated in a garden.

Beg. rex Putz.

Rhizome creeping, often above the ground; leaves obliquely ovate, shallowly dentate or deeply lobed, white-banded or-spotted above, red hairs on nerves; flowers pale pink, native of India.

Beg. semperflorens Link & Otto

Erect, branched, glabrous or sparsely hairy; flowers pinkish white; from Brazil.

37. DILLENIACEAE

Key to the genera

- A. Woody climber ; filaments broadened; follicles dehiscent; seeds arillate, the aril fimbriate *Tetracera*
- A. Trees or shrubs, erect; filaments not broadened.
 - B. Follicles dehiscent; seeds arillate, the arils fleshy *Wormia*
 - B. Follicles enclosed in the thickened pulpy sepals, indehiscent; seeds not arillate *Dillenia*

Dillenia aurea Sm.

Sometimes cultivated as a roadside tree; wild in northern Malaya.

Dil. grandifolia Wall. ex Hook. f. et Thoms.

Large tree, with buttresses and stilt roots; leaves elliptic to obovate with a rounded or obtuse tip and a narrowed base, in sappling can reach 1 meter long; flowers without petals; in dense forests; Bukit Timah (*Corner 34906*), Garden's jungle; called *D. scortechinii* King or *D. exima* Miq. in Malayan literature.

Dil. indica Linn.

Flowers 15–20 cm. across, the petals white; once wild near Reservoir and Bukit Panjang (*Ridley 3702*), now survived in cultivation.

Dil. reticulata King

Tall tree, with stilt roots and apetalous flowers; leaves elliptic to oblong, with a rounded or emarginate tip and a rounded base; sappling leaves 1 to 1.5 meter long; flowers with yellow petals; Bukit Timah, Gardens' Jungle. No specimens available.

Tetracera akara (Burm. f.) Merr.

Tall woody climber, in forests; Gardens' Jungle, Changi, Mandai Road (*Sinclair 40025Q*; called *T. sylvestris* Ridl. in Ridley's Flora.

Tetr. arborescens Jack.

Climber, not rare, found along Cluny Road and at Kranji (*Ridley 262*); also called *T. euryandra* Vah. or *T. lucida* Wall.

Tetr. fagifolia Bl.

In woods, Gardens' Jungle (*Ridley 6381*), Seletar, not common; also called *T. sumatrana* Miq.

Tetr. indica (Christm & Panz.) Merr.

Climbing and scrambling shrub, common in open country, often forming thickets; flowers pinkish (Singapore, *Hullett* 489). Formerly called *T. assa* DC. in Malayan literature.

Tetr. macrophylla Wall. ex Hook. f. & Thom.

Climber, common in woods; Tanglin, Changi (*Hullett* s.n. in 1893), often remaining sterile.

Wormia excelsa Jack.

Tall tree; Bukit Timah, Gardens' Jungle, Seletar (*Nur* 6382); alternative name is *Dillenia excelsa* (Jack) Gilg, should one consider *Dillenia* and *Wormia* being congeneric.

Wormia pulchella Jack.

Small bushy tree; leaves deep green; flowers pale yellow; Tanglin, Bukit Timah, Mandai Road (*Sinclair* 40270), in wet places. Alternative name is *Dillenia pulchella* (Jack) Gilg.

Wormia suffruticosa Griff.

Large shrub; leaves with a folded winged petiole; flowers bright yellow; fruits when ripe split open like a star; common all over the Island (*Ridley* 3966). Alternative name is *Dillenia suffruticosa* (Griff.) Mart. Vern. *Simpoh Ayer*.

38. ACTINIDIACEAE

Saurauia tristyla DC.

Tree; leaves oblanceolate; flowers unisexual, pinkish, 2–3 in cymes, axillary or on small tubercles on the branches; fruit globose; Bukit Timah, *Ridley* 10440. The correct name is *S. pentaphylla* (Jack) Hoogl. ined. to be validated in volume 30 of this Bulletin.

39. HYPERICACEAE

Key to the genera

- | | |
|---|-------------------|
| A. Trees; flowers white to pink; seeds winged | <i>Cratoxylum</i> |
| A. Herbs; flowers yellow; seeds not winged | <i>Hypericum</i> |

Cratoxylum arborescens Bl.

Large tree; flowers deep red, in panicles; capsule purplish, with many seeds; Bukit Timah, Gardens' Jungle, Seletar (*Sinclair* 40008), in woods. Vern. *Geronggang*.

Crat. formosum (Jack) Dyer.

Tree; flowers rose-pink; in open country; Bukit Timah (*Whitmore* 78), Bukit Mandai, Chua Chu Kang. Vern. *Derum*.

Crat. cochinchinense Bl.

Tree; bark red, peeling off in strips or angular pieces; flowers pink to dark red; Bukit Timah, Bukit Mandai (*Nur 358a*), Changi, Chan Chu Kang, in woods. As *Crat. polyanthum* Korth. in Ridley's Flora. Vern. *Derum selunchor*, 黃牛木。

Hypericum japonicum Thunb. ex Murray

Tiny herb with yellow flowers, formerly found in pepper plantations at Bukit Mandai and Chua Chu Kang (*Mat* s.n. in 1894), now probably extinct.

40. GUTTIFERAE

Key to the genera

- A. Ovary 1-2-chambered; flowers bisexual.
 - B. Ovary 1-chambered; leaves with numerous parallel side veins **Calophyllum*
 - B. Ovary 1-2-chambered, with 1 or 2 ovules in each chamber *Mesua*
- A. Ovary 4-5 (-12)-chambered.
 - C. Flowers unisexual, dioecious; petiole-base clasping the twig *Garcinia*
 - C. Flowers polygamous; petiole-base not clasping the twig *Mammea*

Calophyllum austrocoriaceum Whitmore

Gardens' Jungle (*SFN 39452*), MacRitchie Reservoir.

Cal. biflorum Henders. & Wyatt-Sm.

Sungei Hanto, opposite Pulau Serimbun (*SFN 39532*).

Cal. costulatum H. & Wyatt-Sm.

Bukit Timah (no specimens available).

Cal. ferrugineum Ridl.

Common; Bukit Timah, Changi, Tanjong Gul (*Ridley 1959*).

Cal. incrassatum Henders. & Wyatt-Sm.

In lowland forest; Bukit Timah, Mandai, Sungei Morai (*Ridley 5071*).

Cal. inophyllum L.

Tree; leaves with numerous fine, parallel side veins; flowers white, in raceme-like inflorescence; fruit like a small pingpong ball, waxy green; common on the sea-shores, often planted in gardens, several parts of the plant are used in native medicine; Bajau (*Ridley s.n.*), Pulau Seletar, P. Ubin. Vern. *Penaga Laut*, 瓊崖海棠樹。

Cal. macrocarpum Hook. f.

Rare, one old collection from Changi (*Goodenough* s.n.).

'Cal. molle King'

Once collected in swamp forest at Mandai (*SFN 37715*), but not an exact match; to be referred to a taxon related to *C. pisiferum* Pl. & Tr.

Cal. pulcherrimum Wall. ex Choisy

Common; Gardens' jungle, Changi (*Ridley 4636*), Kranji, Bukit Mandai, Bukit Timah.

*Grateful acknowledgement is made to Dr. Peter F. Stevens for additional information on the genus *Calophyllum* incorporated in this script.

'Cal. retusum Wall. ex Choisy'

Not common; Nee Soon, Jurong (*Corner* s.n. in 1932). Superfluous name for *Cal. burmannii* Wight, to be renamed as *Cal. sundaicum* P.F.S. ined.

Cal. rigidum Miq. (= *Cal. kunstleri* King)

Rare; Bukit Mandai (*Ridley* 1955), Jurong.

Cal. rubiginosum Hend. & Wyatt-Sm.

Easily confused with *Cal. wallichianum*, but differs from the latter by its pale yellow twigs with rusty tomentum; Bukit Timah (*Ridley* 6196), Chua Chu Kang.

Cal. saigonense Pierre (= *Cal. curtisii* King)

Once collected at Gardens' jungle (*SFN* 39434).

Cal. soulattri Burm.

Gardens' jungle, Bukit Timah, Seletar; formerly called *Cal. spectabile* Willd. *Ridley's* Flora. Vern. *Bintangor Bunut*.

Cal. tetrapterum Miq. (= *Cal. floribundum* Hook. f.)

Common, variable; Water Catchment Area, Gardens' jungle (*Ridley* 6935), Bukit Timah.

Cal. teysmannii Miq. (= *Cal. inophylloide* King var. *singaporense* H. & W.-Sm.)

Rare; Changi, Gardens' jungle (*Ridley* 6941).

Cal. wallichianum Planch. et Tr.

Leaves coriaceous, oblong; petiole long, dark red; Bukit Timah (*Ridley* 6333), Chua Chu Kang. Vern. *Bintangor Merah*.

Garcinia atroviridis Griff. ex T. Anders.

Young leaves light red; flowers red, large; fruit orange yellow, 12–16-ribbed. Vern. *Asam Gelugor*.

Gar. bancana Miq.

Along tidal rivers; Kranji, Seletar (*Ridley* s.n. in 1893), Changi.

Gar. dulcis (Roxb.) Kurz

Planted in gardens and villages; fruit round, compressed, light yellow. Vern. *Mundu*.

Gar. eugenifolia Wall. ex T. Anders.

Tree; flowers white, sweet; in woods; Chan Chu Kang, Changi, Seletar (*Mohd Shah* 2367), Tanjong Gul, Pulau Ubin.

Gar. forbesii King

Small tree; flowers cream or pink; fruit small, apple-like, red, edible; Gardens' Jungle, Bukit Mandai (*Ridley* 3585a), Chua Chu Kang.

Gar. griffithii T. Anders.

MacRitchie Reservoir (*Burkill* 3202), Bukit Timah.

Gar. hombroniana Pierre

Flowers cream coloured; like the mangosteen but the fruit smaller; along sea shores, Chan Chu Kang, Changi (*Ridley* s.n. in 1890), Blakang Mati, Pulau Ubin.

Gar. mangostana Linn.

The mangosteen is a common fruit tree, its origin unknown, but it may have been brought into cultivation in S.E. Asia. It is likely that the mangosteen fruits are developed parthenocarpically. Vern. *Manggis*, 山竹, 莽吉柿。

Gar. nervosa Miq.

Shrubby, stem and branches 4-ridged and narrowly winged. Very rare; found on Serangoon Road and Pulau Ubin. Recently found in MacRitchie (*Sinclair* 10764).

Gar. nigrolineata Planch. ex T. Anders.

Tree; flowers small, yellow; fruit small, globose, edible; in woods and open country, Changi (*Ridley* 3611a), Sungei Morai.

Gar. parvifolia Miq.

In lowland and secondary forests; Gardens' jungle, Water Catchment Area (*Sinclair*, 39657).

Gar. rostrata (Hassk.) Miq.

Near *Gar. eugenifolia*, possibly not distinct (fide Whitmore); Bukit Mandai (*Ridley* 5824).

Mammea americana L.

The mammee apple, native of S. America, is occasionally cultivated.

Mesua ferrea L.

Medium-sized tree; wood hard, heavy and durable – Ironwood Tree. Native of Malaya. Vern. *Penaga*.

41. THEACEAE

Key to the genera

- | | |
|--|---------------------|
| A. Leaves alternate, distichously arranged in two rows on one plane. | |
| B. Flowers minute (less than 0.5 cm across), unisexual, several in axillary clusters | <i>Eurya</i> |
| B. Flowers larger (about 1 cm across), bisexual, singly or 2-3 in leaf-axils | <i>Adinandra</i> |
| A. Leaves alternate, spirally arranged on branches. | |
| B. Leaves sessile; petals twisted; fruit a capsule, dehiscing from base by 5 thin, leathery valves | <i>Ploiarium</i> |
| B. Leaves petiolate; petals imbricate. | |
| C. Fruit dehiscent, dehiscing from top by 5 thick woody valves; seeds winged | <i>Gordonia</i> |
| C. Fruit indehiscent; seeds not winged. | |
| D. Fruit drupe-like (or actually an inrehiscent capsule), with very thick hard wall; plants hairy | <i>Pyrenaria</i> |
| D. Fruit a berry; with soft leathery wall; plants glabrous | <i>Ternstroemia</i> |

Adinandra acuminata Korth.

Like *Adin. dumosa*, but leaves thinner and more pointed, and petals fully open; in woods, Gardens' Jungle, Sembawang, Chan Chu Kang, Bukit Timah (*Ridley* 6771).

Adin. dumosa Jack

Small tree or shrub; flowers cream white, the petals always remaining closed; berry with a long pointed style, carried away and sucked by bats; open country, especially common in secondary jungles all over the Island (Bukit Timah, *Goodenough 1953*). Vern. *Tiup tiup*.

Adin. hullettii King

Branches and lower surfaces of leaves densely covered with brown hairs; not common, Gardens' jungle, Seletar (*Ridley 3655*), Bukit Timah.

Eurya acuminata DC.

Shrub or small tree; flowers minute (less than 0.5 cm across), yellowish, unisexual; several crowded in leaf axils; along forest margins, Nee Soon, Mandai (*Baker s.n.* in 1917).

Gordonia multinervis King

Like *Gord. singaporeana*, but petioles not winged to the base; in forests, relatively rare; Bukit Timah (*Corner 36435*).

Gord. penangensis Ridl.

Small tree; branches silky pubescent; rare, in forests of Water Catchment Area (*Ridley 6284*).

Gord. singaporeana Wall. ex Ridl.

Large tree; branches glabrous; flowers 3–4 cm across; fruit an elongate, 5-valved capsule; seeds with an oblique long wing; Bukit Timah, Jurong, Changi (*Ridley 3812*), also common in Water Catchment Area.

Pyrenaria acuminata Planch.

Small tree; branches hairy; flowers white; fruit green, 3.5–4 cm across, like a small apple, indehiscent; in thick woods, Bukit Timah (*Ngadiman 34535*), Tanglin, Water Catchment Area.

Ploiarium alternifolium (Vahl) Melchior

Shrub or rarely a tall, slender tree, glabrous; flowers pinkish white; fruit a 5-valved capsule, opening from base upwards; both in dry secondary jungles and in swampy areas, Tanglin, Jurong, Changi, Water Catchment Areas, Bukit Timah (*Goodenough 1945*). Called *Archytaea vahlii* Choisy in Ridley's Flora. Vern. *Riang Riang*.

Ternstroemia bancana Miq.

Small tree, glabrous; flowers yellowish, 2 cm across, unisexual; berry ovoid, few-seeded, about 3 cm long; in forests, Bukit Timah, Seletar (*Ridley 1948*).

Terns. wallichiana (Griff.) Engl.

Like the above species, but with slightly larger flowers (2.5 cm across) and bigger fruit (to 3.5 cm long), near the sea, Changi, Pulau Tekong (*Ridley 1807*).

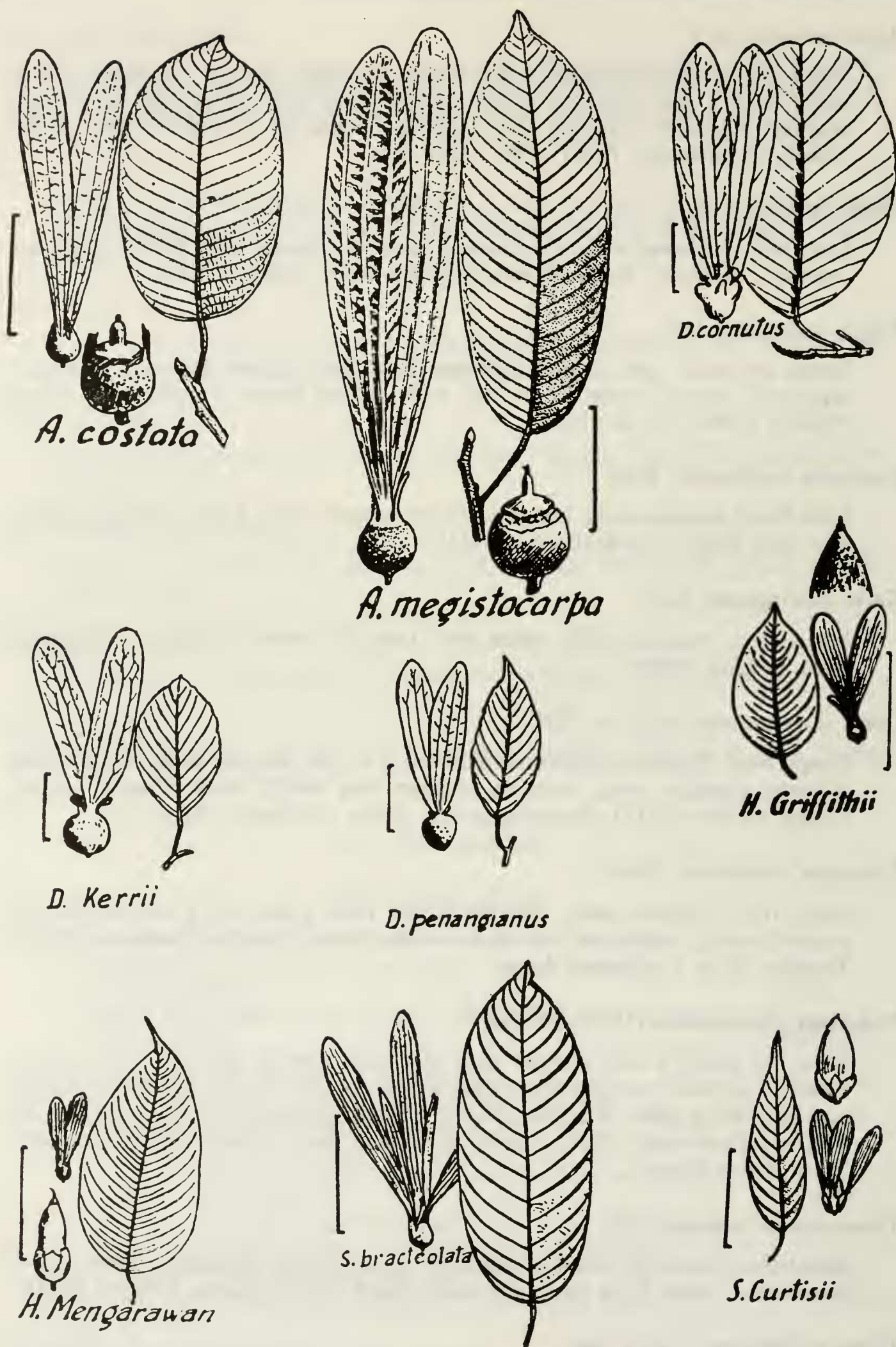


Figure 1. Leaves and fruits of Singaporean species of *Anisoptera* (A), *Dipterocarpus* (D), *Hopea* (H), and *Shorea* (S). Scale in 5 cm.
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42. DIPTEROCARPACEAE

Key to the genera

- A. Sepals in fruit woody and persistent, not developed into conspicuous wings *Vatica* (in part)
- A. Sepals in fruit enlarged and developed into wings.
 - B. 3 outer wings (or enlarged sepals) much larger than the 2 inner ones *Shorea*
 - B. 2 outer wings much larger than the 3 inner ones.
 - C. Wings with at least 7 longitudinal veins *Hopea*
 - C. Wings with 5 conspicuous veins *Vatica* (*maingayi*)
 - C. Wings with only 3 prominent veins.
 - D. Persistent calyx tube free from the nut *Dipterocarpus*
 - D. Persistent calyx-tube united with the nut *Anisoptera*

***Anisoptera costata* Korth.**

Large tree; leaves 12 x 6 cm, dull yellow and hairy on the veins on the lower surface; Garden's jungle; Bukit Timah (*Sinclair* 40623). Vern. *Mersawa Kesat*.

***Anis. megistocarpa* Soot.**

Leaves slightly larger than above species (15 x 7 cm), coarsely hairy, dark reddish brown on the upper surface; Garden's jungle (*Ridley* 6684); Bukit Timah. Vern. *Mersawa Merah*.

***Balanocarpus heimii* King**

Ridley (in *Roy. Asiat. Soc. Str. Br.* 33: 28, 1900) suggested that the district name Changi was derived from *Chengal*, a vernacular name for this species, and postulated its occurrence in Singapore prior to 1850. According to *Symington*, this species is endemic to but widely distributed in the Malay Peninsula, and it occurs in every State except Perlis and Malacca. Its heavy and durable wood is well known. It is also the source of *damar penak*, one of the finest natural dammars from this part of the world. *Ridley's* postulation is highly plausible, although there is no specimen of this species from Singapore available.

***Dipterocarpus cornutus* Dyer**

Large tree; leaves large (25 x 15 cm), smooth, pale yellow, minutely tomentose beneath; about 20-nerved; common in regenerated forests; Bukit Timah, Changi, Mandai (*Ridley* 3753). Vern. *Keruing Gambang*.

***Dip. kerrii* King**

Leaves rather small (12 x 7 cm), shining, about 9-nerved, long-petioled; Bukit Timah, Dalvey Road (*Corner* 31429). Vern. *Keruing Gondol*.

***Dip. penangianus* Foxw.**

Leaves rather small (12.5 x 6 cm), drying dull grey-brown, about 10-12-nerved; fruit top-shaped, warty, the wings up to 15 cm long; Bukit Timah (*Ngadiman* 35569); according to Dr. Ashton in sched., this plant should be called *Dipt. caudatus* Foxw.

Hopea griffithii Kurz

Large tree, with smooth bark; dried leaves 6.5 x 3.5 cm, dull, purple-brown, with midrib depressed on the upper surface; Bukit Timah (*Henderson 35928*), Garden's jungle. Vern. *Merawan Jantan*.

Hop. mengarawan

Large tree, fissured-barked, buttressed; leaves larger than those of above species (10 x 3.5 cm), drying yellowish brown; common; Bukit Timah (*Kiah 36494*), formerly also found in Chan Chu Kang. Vern. *Merawan Penak*.

Shorea bracteolata Dyer

Large tree; leaves elliptic-oblong, 12.5 x 6 cm, glabrous; petioles about 2 cm long; Dalvey Road (no specimen available). Vern. *Meranti Pa'ang*.

Shor. curtisii Dyer ex King

Crown light-coloured; leaves lanceolate, 10 x 3 cm, acuminate, glaucescent beneath; Bukit Timah (*Symington 3478*). Vern. *Seraya*.

Shor. gibbosa Brandis

Leaves ovate-lanceolate, 8 x 3 cm, glabrous; flowers pinkish; Garden's jungle (*Ridley 6079*). Vern. *Damar Hitam Gajah*.

Shor. gratissima Dyer

Leaves small (9 x 3.5 cm), ovate-lanceolate, smooth; flowers white; common; Garden's jungle, Kranji, Chan Chu Kang, Bukit Timah (*Corner 34642*). Vern. *Meranti Laut*.

Shor. leprosula Miq.

Crown yellowish brown; leaves elliptic, 12.5 x 5 cm, yellow-tomentose beneath; common; Garden's jungle, Bukit Timah (*Ngadiman 35909*). Vern. *Seraya*.

Shor. macroptera Dyer

Bole comparatively smooth; leaves leathery, oblong, 15 x 5 cm, variable; fruit wings auriculate; common; Garden's jungle (*Burkill 1272*), Chan Chu Kang. Vern. *Meranti*.

Shor. ovalis Bl.

Twigs hairy; leaves elliptic-oblong, 18 x 7 cm, scabrid; flowers white; rare; Garden's jungle (*Sinclair 40664*). Vern. *Meranti Kepong*.

Shor. parvifolia Dyer

Large tree, bark closely fissured; leaves small (9 x 4 cm), ovate-elliptic or oblong-lanceolate; Bukit Timah (*Ngadiman 35795*), Garden's jungle. Vern. *Meranti Sarang Punai*.

Shor. pauciflora King

Bole grayish brown, scaly; leaves ovate-oblong, 9 x 5.5 cm, acuminate, about 10-nerved, tertiary veins inconspicuous; flowers yellow; Garden's jungle, MacRitchie Reservoir (*Sinclair 8917*).

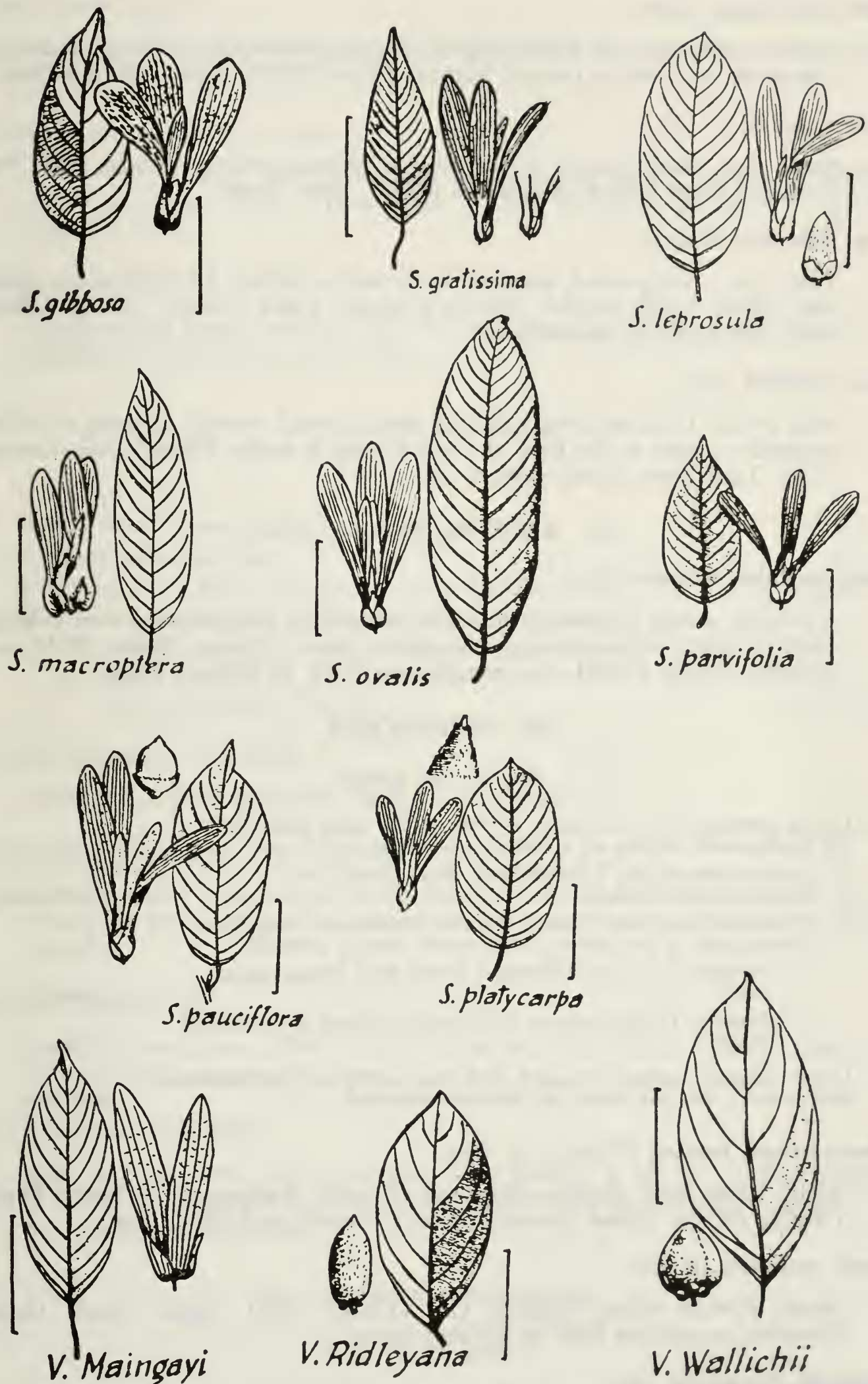


Figure 2. Leaves and fruits of Singaporean species of *Shorea* (S) and *Vatica* (V).
Scale in 5 cm. U.M.P. copyright reserved

Shor. platycarpa Heim.

Bark coarsely fissured; leaves elliptic to subrotundate, 10 x 5.5 cm, scabrid or tomentose, in swampy forests; Mandai (*Kiah* 37722). Vern. *Meranti Paya*.

Vatica maingayi Dyer

Small tree; bark rough; leaves with a slender petiole; flowers red; fruit 2-winged; Bukit Timah (*Ngadiman* 34959). Vern. *Resak*.

Vat. ridleyana Brandis

Tree; fruit oblong-ovoid, pointed, warty and wrinkled, 2.5–5 cm long, persistent, sepals small, curved; Garden's jungle, Bukit Timah, Changi (*Ridley* 4448). Vern. *Resak Buah Cana*.

Vat. wallichii Dyer

Fruit ovoid, 1.5–3 cm long; calyx (5 sepals) small, woody, forming a 5-lobed receptacle adnate to the base of fruit; Garden's jungle, Changi (*Goodenough* 1839), Tuas. Vern. *Resak Laru*.

43. ANCISTROCLADACEAE**Ancistrocladus tectorius** Merr.

A hooked woody climber; fruit a nut, winged by the persistent and enlarged sepals; formerly common along the sandy shores (*Changi, Ridley 1901*), now probably extinct. Called *Anc. pinangianus* Wall. in Ridley's Flora.

44. OCHNACEAE

Key to the genera

- A. Leaves arranged in 2 rows, more or less on the same plane; fruit 1-5 single-seeded drupes on a swollen receptacle.
- B. Anthers opening by 2 longitudinal slits; stipules free; inflorescence umbellate *Brackenridgea*
- B. Anthers opening with 2 terminal pores; stipules united on the abaxial side of the petiole; inflorescence usually thyrsoïd.
 - C. Stamens 10; ovary 5-loculate; leaves with intramarginal veins *Gomphia*
 - C. Stamens 12-many, ovary 5-10; leaves without intramarginal veins *Ochna*
- A. Leaves alternate, spirally arranged, with finely spiny margins; stamens 5; fruit a berry, the receptacle not distinctly enlarged. *Euthemis*

Brackenridgea hookeri (Planch.) A. Gray

Small bushy tree; flowers deep red; Changi, Tanjong Gul, Bukit Timah (*Ridley* 10738). Called *Gomphia hookeri* Planch. in Ridley's Flora.

Brack. palustris Bartell

Shrub; flowers white; Tanjong Gul (*Ridley* 1957), Bukit Timah. Called *Gomphia corymbosa* Ridl. in Ridley's Flora.

Euthemis leucocarpa Jack

An under shrub; flowers white; berries rounded, white; in sandy woods, Kranji, Pasir Panjang (*Ridley* 14156), Changi.

Euth. minor Jack

Small ascending subshrub; berries 5-angled, dark red; in sandy woods, Chua Chu Kang (*Ridley 14191*).

Gomphia serrata(Gaertn.) Kanis

Small tree; flowers yellow, in panicles; common; Bukit Timah (*Ngadiman 36492*), Changi, Tuas, Pulau Ubin. Called *Gomphia sumatrana* Jack in *Ridley's Flora*.

Ochna kirkii Oliv.

Bushy shrub; flowers yellow; fruit of 1 to several black berries on a scarlet red receptacle. Native of tropical Africa.

45. CACTACEAE

Key to the genera

- | | |
|---|-------------------|
| A. Shrubs, not succulent; leaves large, oblong, flat | <i>Pereskia</i> |
| A. Succulent shrubs or trees. | |
| B. Leaves small, nearly cylindrical; flowers without a tube | <i>Opuntia</i> |
| B. Leaves usually absent; flowers with a prominent tube. | |
| C. Plants erect, joint columnar; flower-tubes bearing scales | <i>Cereus</i> |
| C. Plants not erect (or possibly erect at first); joints flat and thin, leaf-like | <i>Epiphyllum</i> |

Cereus peruvianus (L.) Mill.

Arborescent, stem columnar; from tropical America.

Epiphyllum oxypetalum (DC) Haw.

Shrubby, much branched; night-blooming, the common Keng Hwa (瓊花); a variety of forms results from hybridization and selection. Native of tropical America.

Opuntia vulgaris Mill.

Shrub or small tree, often strongly branched; introduced from S. America. Also called *O. monacantha* Haw.

Pereskia grandifolia Mill.

Spiny shrub; leaves oblong; flowers rose-coloured, a few in clusters. Native of W. Indies. Species of several other genera such as *Mammillaria*, *Zygocactus*, etc. are kept as pot plants.

46. ARISTOLOCHIACEAE

Key to the genera

- | | |
|---|---------------------|
| A. Climbers; perianth spatulate tubular, zygomorphic; capsule globose | <i>Aristolochia</i> |
| A. Erect or creeping shrubs; perianth bell-shaped, 3-lobed, $\pm$ regular; capsule elongate | <i>Thottea</i> |

Aristolochia unguifolia Mast.

A climber with large trilobed leaves and purple flowers; once found by Ridley in wet grassland at Jurong (*Ridley* 5836). Probably extinct. Several other species are however cultivated, the commonest one being *Arist. tagala* Cham. which is introduced from Malaya.

Thottea dependens Klotzsch.

Shrub; perianth-tube globose; collected once from Sungei Morai (*Goodenough* 5570).

Thot. grandiflora Rottb.

A low shrub, covered with rough brown hairs; flowers dark purple, the perianth bell-shaped, hairy with raised green veins externally; locally abundant in Reservoir jungles (*Burkill* 3162).

47. NEPENTHACEAE**Nepenthes ampullaria** Jack

Pitchers of two different kinds: aerial pitchers cup-shaped larger, to 25 cm long, green or spotted with purple; ground pitchers globose, in groups or whorls; lids of all the pitchers very narrow; common in open country, especially in borders of woods (*Symington* 22984).

Nep. gracilis Korth.

Pitchers tubular, small (9–10 cm long), green, sometimes tinged red; leaves sessile; common in open country, borders of belukar; Seletar (*Md. Shah* 2400). Vern. *Peviok Kera*, 豬籠草,

Nep. phyllamphora Willd.

Pitchers tubular, 12–15 cm long, green; leaves long-petiolate; rare, Changi and Jurong (no specimens available).

Nep. rafflesiana Jack

Aerial pitchers narrowly funnel-shaped, large, to 30 cm long, green at the base and purplish-red towards the mouth; ground pitchers urn-shaped; lids large and broad; common; Jurong (*Ridley* s.n. in 1889).

48. CARYOPHYLLACEAE

Key to the genera

- | | |
|---|-----------------|
| A. Erect herb; leaves lanceolate or oblong; flowers solitary, showy | <i>Dianthus</i> |
| A. Slender trailing herb; leaves kidney-shaped; flowers very small in cymes | <i>Drymaria</i> |

Dianthus chinensis L.

Annual herb; flowers red or red-and-white banded, often in polypetalous form: from E. Asia, 石竹。

Dianthus caryophyllus L.

Cut flowers of the carnation are sold by florists, imported.

Drymaria cordata (L.) Willd. ex R. & S.

Tiny trailing herb, from temperate regions to tropical mountains, only recently collected from Chua Chu Kang (*Sinclair 38589*).

49. AMARANTHACEAE

Key to the genera

- A. Leaves spirally arranged.
 - B. Fruit 1-seeded.
 - C. Flowers bisexual, in axillary, head-like clusters *Allmania*
 - C. Flowers unisexual, in spikes or panicles *Amaranthus*
 - B. Fruit many-seeded; flowers in spikes, thick combs, or loose panicles *Celosia*
- A. Leaves opposite.
 - D. Lower flowers accompanied by fascicled hooks; inflorescence spike-like *Cythula*
 - D. Flowers not accompanied by hooks.
 - E. Flowers in head-like clusters.
 - F. Heads small axillary *Alternanthera*
 - F. Heads large, terminal *Gomphrena*
 - E. Flowers in a large terminal, elongate spike *Achyranthes*

Achyranthes aspera L.

A tall herb, more or less woody below, erect or ascending; leaves opposite, thick and hairy; spikes stiff, elongate with flowers pointing downwards; in waste places or near villages (*Ridley 10632*).

Allmania nodiflora R. Br. ex Wight

Spreading herb; leaves long and narrow; flowers in round, nodding heads; in sandy places near the sea; Changi (*Md. Nur 29745*).

Alternanthera amoena (Lem) Voss

The Telanthera, a native of Brazil, with green or reddish branches and leaves, is often planted in bordering paths and flower beds and in fish tanks.

Alternanthera sessilis (L.) DC.

Creeping herb; leaves opposite; flowers in small globular, axillary heads; in waste ground (*Hullett 580*). Vern. *Keremak*.

Amaranthus lividus L.

Slightly creeping herb, without spines; leaves oblong or rhomboid, sometimes with a notched tip; flowers unisexual, in dense spikes; a weed, common in waste ground, Pulau Ubin (*Ridley 4690*); but often eaten as vegetable; as *Amar. blitum* Miq. (broader leaves with a notched tip) and *Amar. viridis* L. (narrower leaves with a pointed tip) in Malayan literature. Vern. *Bayam*.

Amar. spinosus L.

Erect spinous herb, much branched; a common weed in waste places. Jurong (*Ridley 8920*). Vern. *Bayam Duri*.

Amar. tricolor L.

The Chinese spinach (莧菜) has two forms: green-leafed and variegated-leafed (variously known as *Amar. caudatus* L. or *Amar. paniculatus* L.). They are cultivated either as a pot-herb or as an ornamental. Vern. *Bayam*.

Celosia argentea L.

Erect herb; leaves spirally arranged; flowers in dense, elonged racemes; a pantropical weed occasionally found in waste places; Mt. Pleasant (*Hullett 154*); two commonly cultivated forms which originated from this wild species are: (1) var. *plumosa*, having a large paniculate inflorescence with many plummy slender side branches and (2) var. *cristata*, having heavy headed, convolute combs. (Cockscomb, 鷄冠花).

Cythula prostrata Bl.

Creeping and ascending herb; leaves opposite; spikes long; flowers 1–3 in a cluster, the peripheral flowers sterile, with many stiff, hooked hairs on the perianth; in waste places (*Hullett 379*). Vern. *Nyarang*.

Gomphrena globosa L.

Herb; leaves opposite; flowers in a terminal globular head ("Bachelor's button"); native of tropical America, often cultivated as an ornamental.

50. CHENOPODIACEAE

Spinacia oleracea L.

The spinach (菠菜) is imported from the hill stations in Malaya; its leaves are served as vegetable. It is a native of West Asia. Another less common root vegetable, the sugar beet (*Beta vulgaris* L. 甜菜), also belonging to this family, is a native of S. Europe.

51. AIZOACEAE

Key to the genera

- | | |
|---|-----------------|
| A. Erect slender herb; flowers minute, in cymes | <i>Mollugo</i> |
| A. Prostrate succulent herb; flowers conspicuous solitary | <i>Sesuvium</i> |

Mollugo pentaphylla L.

Annual herb, glabrous; leaves 3–5 or more in a node; flowers small, yellowish or reddish; in sandy and exposed places; Changi (*Ridley s.n.* in 1893). Vern. *Sepit*, 粟米草。

Sesuvium portulacastrum L.

Prostrate or ascending herb or undershrub; flowers rose-pink with many stamens; on clay soil near the seashores; Changi (*Hullett 406*). Vern. *Gelang Laut*.

52. PHYTOLACACEAE

Rivina humilis L.

Erect herb or subshrub; flowers pinkish, 4-merous, in racemes; berry bright red. Native of tropical America. Occasionally naturalized.

53. NYCTAGINACEAE

Key to the genera

- A. Herbaceous plants.
 - B. Flowers tiny, in cymes, bracts small *Boerhaavia*
 - B. Flowers showy, solitary; involucral bracts 5, green *Mirabilis*
- A. Woody plants.
 - C. Woody climbers; flowers bisexual, 3 in a simple cyme, subtended by 3 large coloured involucral bracts *Bougainvillea*
 - C. Tree or shrub; flowers unisexual and many in small cymes; bracts inconspicuous *Pisonia*

***Boerhaavia diffusa* L.**

A prostrate herb, finely branched; flowers very small, pinkish; sandy places near the seashore; Geylang (*Ridley 9131*).

***Bougainvillea glabra* Choisy**

Leaves smooth; stem less thorny; flowering bracts rose-red; native of Brazil.

***Boug. spectabilis* Willd.**

Leaves hairy; stem thorny; flowering bracts purplish red; native of Brazil. In addition to this two, several horticultural varieties and hybrids are found in gardens. 九重葛。

***Mirabilis jalapa* L.**

Herb; flowers white, red, pink or yellow, unfolding in the afternoon (*Four O'clock*); native of tropical America. Vern. *Bunga Pukul Empat*. 晚飯花。

***Pisonia grandis* R. Br.**

Shrub or small tree; sometimes cultivated near the sea for its bright yellowish-green leaves which are also edible, called the *Lettuce tree*; native of Andamans and elsewhere.

54. BASELLACEAE

***Basella alba* L.**

Twining herb, rhizomatous; leaves and branches succulent, green or purple (as *Bas. rubra* L. and treated a separate species by some authors); cultivated and served as a vegetable; native to S. E. Asia and Africa. Vern. *Remayong*, *Gendola*, 落葵。

55. PORTULACACEAE

Key to the genera

- A. Flowers solitary or in clusters; ovary half-inferior; capsule opening by a lid *Portulaca*
- A. Flowers in racemes or panicles; ovary superior; capsule opening by 3 valves *Talinum*

Portulaca oleracea L.

Succulent herb, prostrate on open sandy places; flowers with 5 bright yellow petals; common; in waste places, Changi (*Ridley* s.n. in 1894); sometimes served as a vegetable. Vern. *Segan*, 馬齒莧。

Port. quadifida L.

A smaller plant; stem with tufts of white hairs on the joints; flowers with 4 yellow petals; in waste places, Changi (*Ridley* 9566).

Port. grandiflora Hook.

A native of Brazil, with large red, often polypetalous flowers, sometimes planted in gardens.

Talinum paniculatum (Jacq.) Gaertn.

Perennial herb; stem cylindrical; flowers in a large panicle, opening in the afternoon; native of tropical America, cultivated as a vegetable or an ornamental. Also called *Tal. patens* Usteri.

Tal. triangulare (Jacq.) Willd.

Stem 3-angulate; flowers in racemes, opening in the morning. Native of W. Indies.

56. POLYGONACEAE**Key to the genera**

- | | |
|---|------------------|
| A. Twining herbs by the aid of tendrils | <i>Antigonon</i> |
| A. Erect herbs without tendrils | <i>Polygonum</i> |

***Antigonon leptopus* Hook. & Arn.**

Perennial herb, climbing by tendrils arising from the end of inflorescences; flowers pink or rarely white; native of Mexico, misleadingly called "Hololulu Creeper".

***Polygonum barbatum* L.**

Herb, to 1 m tall; flowers small, white, in spikes; common along ditches; Gelang, Chang Chu Kang, Holland Road (*Ridley* 3756). Vern. *Tebok Seludang*, 毛蓼。

***Poly. chinensis* L.**

A herb found in E. and S. E. Asia and also on high mountains in Malaya; planted as an ornamental or medicinal plant.

***Poly. hydropiper* L.**

A cosmopolitan herb, also found in northern Malaya. Its young leaves and shoots, peppery in taste, are sometimes used as a flavouring.